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(71) Applicant and
(72) Inventor: SAGARESE, Rocco [IT/IT]; Contrada Perolla, 17, I- Savoia di Lucania (IT).

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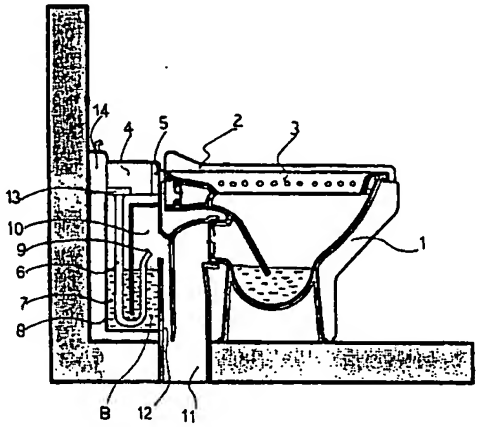
(54) Title: TOILET SUPPLIED WITH A FECAL GAS EXTRACTOR



(57) Abstract: A device that provides for the extraction of foul smelling gas inside a toilet bowl while the feces are produced by the user and flushed directy into the floor outlet pipe (11). The aforesaid device is made up of an electric motor (4) with an extractor fan (5) and an inlet pipe (6), connected directly to the floor outlet pipe (11), provided with a cavity (12), or through the interposition of a siphon, within which the tank containing liquid (7) separates the external environment from the interior of the outlet pipe (11) and does not allow bad smells to return into the room. A control box commands a presence sensor, an IR diode (15), and is inserted in the inner surface of the cover (2), which, when lifted and in the presence of the user, automatically determines the activation of the extractor fan (5) and therefore the extraction of gas through the extractor holes (3) and its deactivation when the cover (2) is lowered and/or the user stands up. The control box activates the check valve (13) and the accessory devices, such as the deodorant filter (14), and a pre-wash or drying device for the internal surface of the toilet bowl.

WO 00/77312 A1

Description

"Toilet supplied with a fecal gas extractor"

Technical field

This invention regards the realization of a toilet with a fecal gas extractor and conveyor that is contained in outlets situated in the rim of the toilet itself.

Background art

Each time the toilet is used, especially for the temporary deposit of excrement, even though the bowl is emptied immediately, the room in which the aforesaid toilet is situated normally retains an unpleasant odor. It is easy to understand that fecal gas, even though normally tolerated by the person who generates it, is unpleasant and embarrassing when other people use the room after a short time.

Nowadays, the aeration of toilets in hospitals, public premises and hotels and in small, poorly ventilated rooms in general, is very important. Usually these premises are aerated by opening the window generally found in this type of room, but premises that have no exterior opening, or in which natural ventilation is impossible, must be supplied with extractor fans or similar devices installed on the walls or windows. These systems for the extraction of vitiated air from toilets through an extractor fan collocated in the room with an outlet to the exterior of the building, are visible, usually ugly and often situated at a certain distance

from the major source of air pollution, that is, the toilet bowl itself. The extractor fan motor, which must be supplied with an outlet to the exterior of the building, must be sufficiently powerful to change the entire volume of air contained in the room within a short period of time. If, however, the user remains in the room for a long time, or if several people use it in quick succession, the internal temperature of the room will soon be the same as that outside. Extractor fans are usually connected to light switches, therefore a person who switches the light on when entering the room simultaneously switches the fan on and on leaving, switches off the light and the fan at the same time. It is evident that if the user stays in the room for a very short period, the air will not be changed completely, given that the fan will not be activated for long enough.

It is therefore clear that the types of extractor in production and on the market at the moment are not exempt from drawbacks, given that they change the air with the following negative results: the user is in any case surrounded by foul-smelling air; excessive use of electricity if the fan is activated for long periods after the toilet has been used; given that the fan must be powerful enough to change all the air in the room in a very brief period, it will also be very noisy

Another system, the request for patent number V192A000056 (Italian), recently to be found on the market, eliminates fecal gas odors through an extractor fan situated on the opposite side of the water tank to the water inlet. The extractor fan with is made in such a way that it will create a

depression in its relative delivery conduit through which the polluted air will be extracted. The odor of fecal gas will therefore be extracted by the same pipe through which the water enters. It will pass through the valve and be expelled outside the building. This ensures that it is not dispersed into the room, but also means that the building must be canalized or supplied with an outlet to the exterior.

The object and important characteristics of the invention

This invention is an alternative to the aforesaid extractor systems which are present in many toilets, both public and private, but which are not exempt from drawbacks.

The aim of this discovery is to eliminate the drawbacks stated above through individually listed devices using components that are innovatively assembled in such a way as to overcome the drawbacks found in products now on the market and which will completely satisfy the new habits created by today's life-style; the invention is practical, especially from the point of view of hygiene, for hospitals, meeting places, restaurants, caravans, buses, campers and other similar places.

Another aim of this invention is to realize a device which will extract the air from the toilet bowl during and after use of the toilet, thus eliminating or reducing bad odors from the environment; it will also represent a notable energy saving, given that only a very small quantity of air actually has to be changed, that is, the air actually in the toilet bowl and

not that of the entire room and which can also deodorize the room through a special deodorant filter.

A further aim of this invention is that of automating the various functions that are activated separately in other similar devices.

5

A Description of the drawings and methods for carrying out the invention

The invention is shown in more detail and with purely demonstrative examples of its realization in conformation with the attached drawings.

10 Fig. 1 shows a three-dimensional view of the toilet in one of its realizations.

Fig. 2 shows a lateral section view of this invention with a siphon barrier for the gas.

Fig. 3 shows a lateral section view of the invention realized in a 15 different form.

Fig. 4 shows a transparent lateral view of the preceding form of realization of the invention when it is applied to a toilet with a wall outlet pipe.

In the figure indicated as (1) a widely used toilet is shown, supplied with 20 a toilet seat and cover (2) which can be raised. Around the inside rim and above the perimetral drain holes of the bowl itself, where the water normally flows out to rinse the bowl, there is a series of extractor holes (3). These holes are connected through a channel afferent to an extractor device which is supplied with an extractor fan (5) run by an electric

motor (4) and to another channel or inlet pipe (6) opportunely shaped in such a way that a part of the pipe is immerged in a liquid (7) which is contained in a small tank (8) internally shaped into a siphon, while the terminal part (9) of the inlet pipe (6) is afferent to a space (10) which is in turn connected to the floor outlet pipe (11) of the toilet through a cavity (12). It is not necessary for the terminal part (9) of the inlet pipe (6) to emerge from the space (10), it can remain under the surface of the liquid (7) in part B of the siphon-shaped container.

The inlet pipe (6) is advantageously provided, near the extractor, with a check valve (13) to avoid reflux both of polluted air and of liquid that could damage the invention. Through another circuit the extractor aspirates the air from the environment outside the toilet and passes it through a deodorant filter (14) in order to make the environmental air more pleasant.

A further device is foreseen, the technical details of which are already known, which consists of a supplementary limited efflux water inlet pipe, the flow of which can be regulated through a valve in order to clean and dampen the inside of the bowl and avoid that the feces or other smelly substances should adhere to the inside of the bowl itself.

For the functioning of the extractor and its accessories a control box is foreseen, which can be activated through an electric pressure-sensitive control or through a sensor capable of recognizing the presence of a person near the toilet and his/her subsequent departure, and which activates the extractor and eventually determines the limited introduction

of supplementary water into the toilet bowl to clean and dampen the inside of the bowl as well as activating the deodorant filter.

The control box is composed of an electronic stabilizer and feed device connected to the local 220v electricity network and which controls the activation of a C.C. motor (4), the shaft of which is coupled to the extractor fan (5) which aspirates the stagnant air inside the toilet bowl sufficiently to eliminate any particularly strong and persistent odors. The extractor fan is automatically activated when the toilet cover is lifted and de-activated when the cover is replaced, or it can function for specially established and pre-set lengths of time.

The control box commands and controls an IR diode (15) that transmits light impulses in the infrared range, which can be found inside the toilet seat cover. The light ray emitted by the IR diode strikes a raised surface (in the case of a person seated on the toilet seat) and is reflected and intercepted by a photoreceptor, giving the result of obtaining a variation of electric voltage.

A system of emission – reception is thereby created that is not influenced by outside luminosity.

More specifically, when the toilet seat and cover are lowered, the photoreceptor receives no signals from the IR diode, while when the cover is lifted and a person is sitting on the seat, the photoreceptor recognizes the presence of a person by capturing the signals emitted by the IR diode and reflected by the person's body and the extractor fan is

automatically activated until the person stands up and closes the cover, according to pre-set and programmed time periods.

This invention functions in an extremely simple way, given that the person who uses the toilet lifts the cover, thus automatically activating the extractor fan which then creates a depression in the toilet through the extractor holes (3). This aspiration over the entire surface of the higher part of the bowl will be sufficient to extract all the gas generated. The toilet bowl is almost completely covered by the person who is using the convenience at that particular moment, given that they are seated on it. In this condition the aspiration carried out by the electric motor (4) and the extractor fan (5) traps all the gas through the inlet pipe (6), expelling it into the floor outlet pipe (11) of the toilet itself. The outlet pipe is usually at atmospheric pressure, as the collector must be supplied with a vent in the higher part. Therefore the slight pressure exercised on the fecal gas is enough to expel it through the floor outlet pipe (11). After the toilet has been used, the person will activate the flushing mechanism and stop the extractor system either automatically or manually. Any eventual residual odors returning through the inlet pipe (6) into the toilet bowl will be blocked by a valve, preferably a check valve (13) and also by a siphon system containing liquid (7), possibly of the heavy non-evaporating type.

In another form of the realization of this invention, there is no siphon and the inlet pipe (6) is connected directly to the floor outlet pipe (11) through the cavity (12), and the extractor system is situated in a box (16)

installed on the wall above the toilet. In this case a deodorant filter device is also foreseen (14) together with the other accessory elements mentioned above.

In yet another form of realization, the inlet pipe (6) is connected to the floor outlet pipe (11) through the cavity (12).

In case the system should break down, or if the electricity should be cut off for any reason, the toilet can be used normally.

Claims

1) A toilet, inside the cover of which an IR diode (15) is situated, and which is provided with a series of extractor holes (3) under the rim of the toilet bowl, connected through a channel afferent to an extractor device with a fan (5) run by an electric motor (4) and characterized by an inlet pipe (6) opportunely shaped so that a part of it is under the surface of a liquid (7) contained in a tank (8), which is shaped internally into the form of a siphon, while the terminal part (9) of the inlet pipe (6) is afferent to a space (10) connected to the floor outlet pipe (11) of the toilet through a cavity (12).

2) A toilet with a fecal gas extractor as stated in claim 1), characterized by the fact that the terminal part (9) of the inlet pipe (6) does not emerge from the space (10), but remains submerged below the surface of the liquid (7) in part B of the siphoned container.

3) A toilet with a fecal gas extractor as stated in claim 1), characterized by the fact that the inlet pipe (6) is connected directly to the floor (or wall) outlet pipe (11) interpositioned by the cavity (12), while the extractor system is situated in a box (16) installed on the wall above the toilet.

4) A toilet with a fecal gas extractor as stated in claims 1), 2) and 3), characterized by the fact that the inlet pipe (6) is advantageously supplied, near the extractor fan, with a check valve, preferably of an electromagnetic type, for smells or liquids.

5) A toilet with a fecal gas extractor as stated in claims 1) and 2), characterized by the automatic activation of the extractor fan when the cover (2) of the toilet seat is lifted and when the user is present, while it is de-activated by simply lowering the cover or when the person stands up, through specially pre-set timing.

6) A toilet with a fecal gas extractor as stated in claims 1), 2) and 3), characterized by the fact that the extractor system, through another circuit, can also extract air from the room and pass it through a deodorant filter (14), in order to make the air in the room more pleasant.

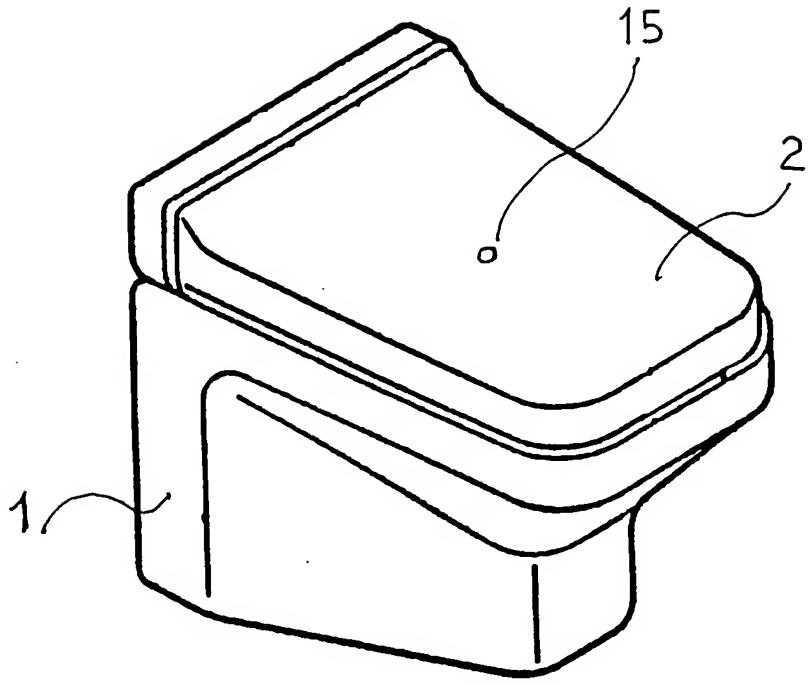


FIG.1

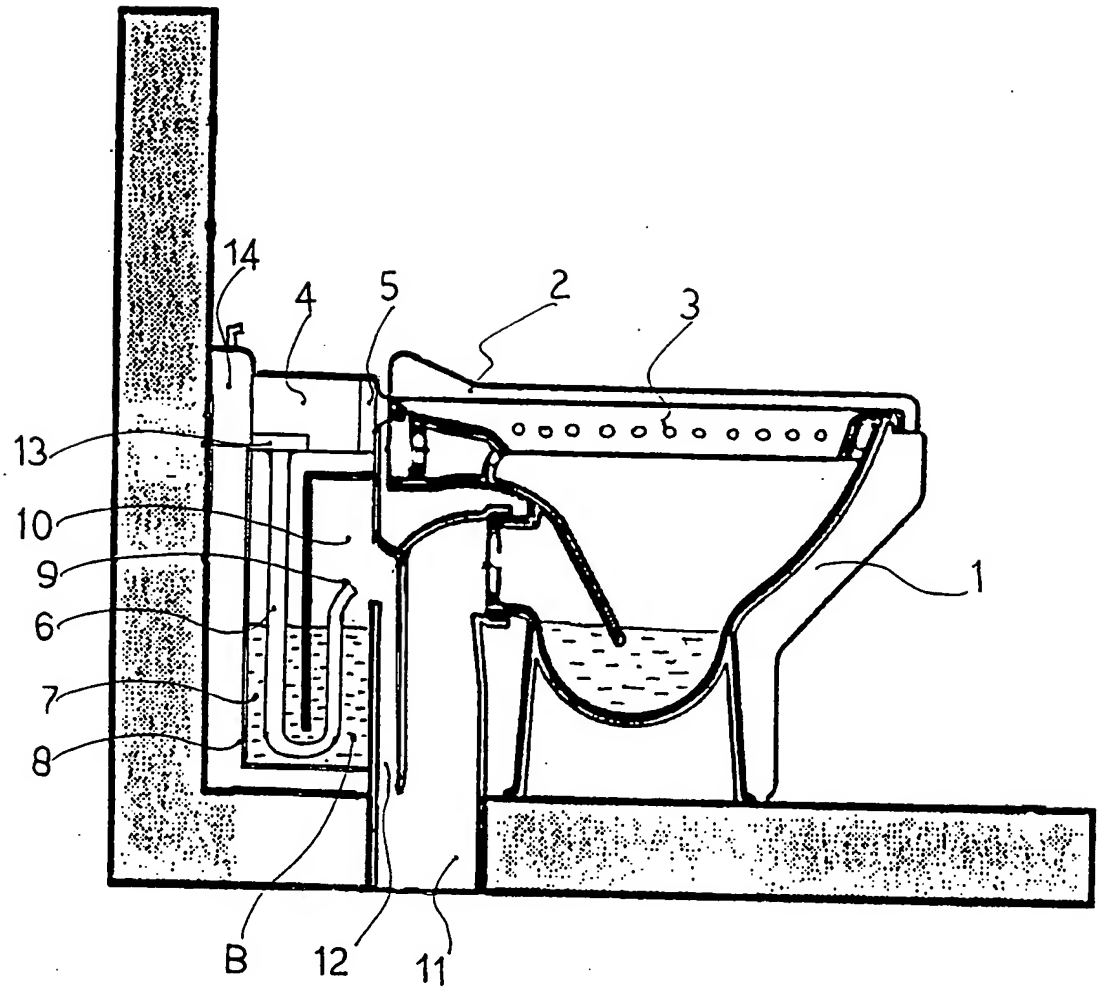


FIG.2

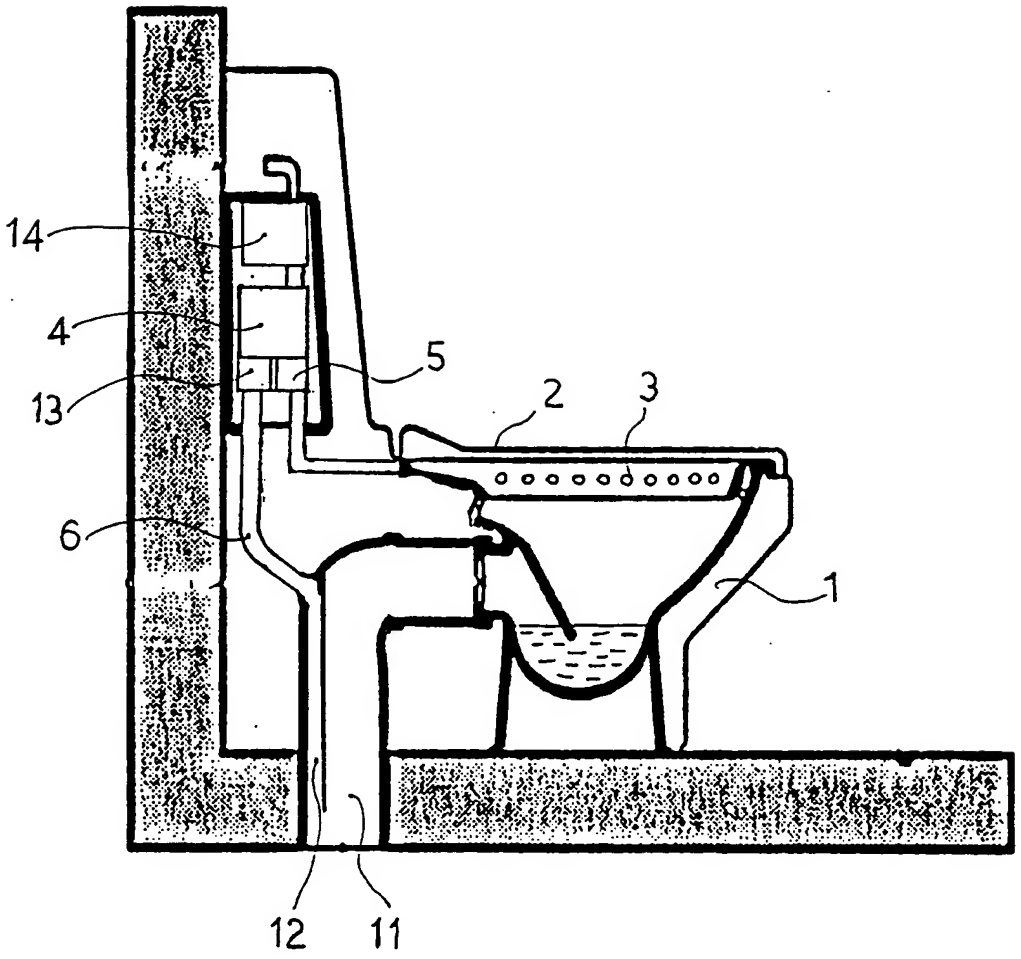


FIG.3

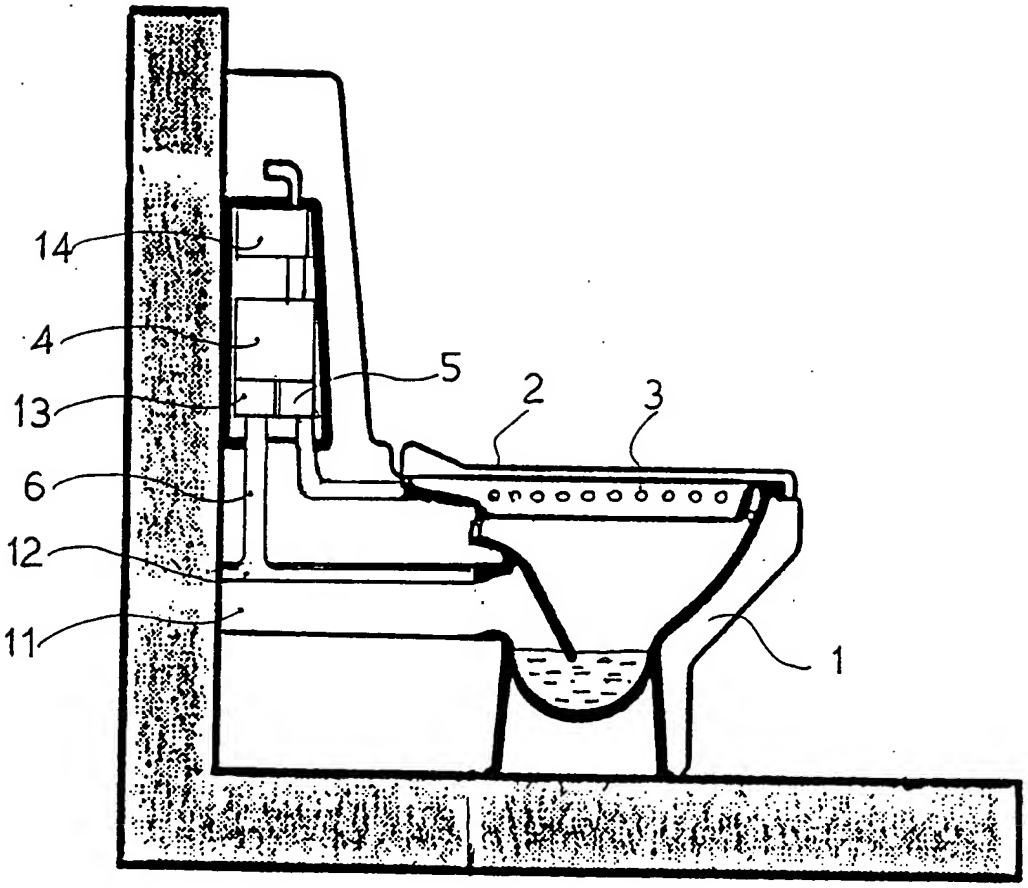


FIG.4

INTERNATIONAL SEARCH REPORT

Int ..tional Application No
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A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 E03D9/052

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 E03D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 195 05 885 A (FROBOESE ERIKA) 22 August 1996 (1996-08-22) figures 1,2,12 ---	1,2,4
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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
18 February 2000	01/03/2000

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Andlauer, D

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INTERNATIONAL SEARCH REPORT

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PCT/IT 99/00274

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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